Function-Based Treatments for Escape-Maintained Problem Behavior: A Treatment-Selection Model for Practicing Behavior Analysts

Kaneen B. Geiger, M.S., James E. Carr, Ph.D., BCBA-D,
and Linda A. LeBlanc, Ph.D., BCBA-D
Auburn University

ABSTRACT

Escape from instructional activities is a common maintaining variable for problem behavior and a number of effective treatments have been developed for this function. Each of these treatments has characteristics that make them optimal for certain environments and clients, but less optimal for others. We summarize the most commonly researched function-based treatments for escape-maintained behavior, describe the contexts for which they are most appropriate, and provide a clinical model for selecting treatments based on client characteristics and the constraints of the therapeutic environment.

Keywords: Activity choice, clinical decision making, curricular revision, demand fading, differential reinforcement, escape, extinction, function-based treatment, noncontingent reinforcement

One of the most common reinforcement functions of problem behavior is escape from instructional stimuli. Escape, or the social-negative reinforcement function, has been shown to be at least as prevalent as and sometimes more prevalent than attention (i.e., social-positive reinforcement) and automatic reinforcement functions. For example, in an analysis of the functions of self-injurious behavior (SIB) of 152 individuals with developmental disabilities, Iwata, Pace, Dorsey, et al. (1994) demonstrated that 35% of the individuals displayed SIB maintained by escape from instruction, compared to 23% and 26% of individuals whose SIB was maintained by attention and automatic reinforcement, respectively. Similarly, Asmus et al. (2004) demonstrated that social-negative reinforcement was the most common maintaining variable for problem behavior either solely or in combination with social positive reinforcement (i.e., multiple control) for 138 individuals with and without developmental disabilities. Finally, Love, Carr, and LeBlanc (2009) found that escape was the second most common function of problem behavior, identified for 50% of 32 children with autism spectrum disorders.

Individuals with disabilities are frequently exposed to learning situations that target important habilitative skills such as pre-academics, activities of daily living, communication, social behavior, among others. Unfortunately, a number of aspects of the instructional environment might become aversive and establish escape from them as a negative reinforcer. For example, task difficulty, rate of instruction delivery, and particular prompting strategies could all have aversive properties for some learners. If problem behavior occurs in response to the aversive situation, a common and understandable reaction of many instructors might be to allow the client time away from the task to "calm down." Frequent instruction, impaired repertoires associated with disabilities, and natural reactions to problem behavior from caregivers likely combine to make escape functions quite common.

Practicing behavior analysts who work with individuals with disabilities in any type of instructional setting should be prepared to treat escape-maintained problem behavior. If a functional assessment indicates that problem behavior is maintained by escape from instructional activities, there are a number of treatments that might be employed as part of a behavioral intervention plan. The current standard for reductive treatments is to base them on the results of a functional assessment. These "function-based" treatments directly address some aspect of the behavior's maintaining contingency (e.g., establishing operation, reinforcer) by, for example, eliminating the contingency through extinction, weakening the establishing operation by making a task less aversive, or teaching the individual a more appropriate way to access the reinforcer (i.e., escape). The remainder of this article will focus exclusively on selecting treatments that directly address a problem behavior's negative reinforcement function.

Selecting an intervention that is likely to be successful for a given client and therapeutic environment can be challenging unless the behavior analyst is well-versed in the characteristics of each treatment and has a framework for choosing between multiple appropriate treatments. Thus, the first purpose of this article is to describe six categories of

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commonly researched, function-based treatments for escape-maintained problem behavior: (a) activity choice, (b) curricular and instructional revision, (c) demand fading, (d) differential reinforcement, (e) extinction, and (f) noncontingent escape (see Table 1). This summary is followed by a clinical decision-making model for selecting the most appropriate treatment based on characteristics of the client and therapeutic environment and their match with the treatment's specific advantages and disadvantages. The focus of the model is escape-maintained behavioral excesses (e.g., self-injury, aggression, property destruction) rather than noncompliance (e.g., non-responding, verbal refusal), but we refer the interested reader to Houlihan, Sloane, Jones, and Patton (1992) and Cipani (1998) for reviews of treatments for noncompliance. In addition, punishment procedures are not included in the present model and the practitioner might view this model as a guide for exploring the full range of function-based treatments before considering explicit punishment procedures.

One of the most common reinforcement functions of problem behavior is escape from instructional stimuli

Function-Based Treatments for Escape-Maintained Problem Behavior

Activity Choice

Activity choice involves providing the learner with an opportunity to select either the order in which, or time at which, tasks are completed (Dyer, Dunlap, & Winterling, 1990). Activity choice is considered a function-based intervention because the individual can presumably avoid the aversive aspects of one task by selecting another. For example, Dyer et al. used activity choice to reduce escape-maintained disruptive behavior (e.g., aggression, SIB, tantrums) of three children with developmental disabilities. Each participant was provided with a choice between 3 to 4 academic tasks (e.g., completing a puzzle, labeling picture cards, sorting). When the first task was complete, the participant chose from the remaining tasks, and so on. For all three participants, activity choice produced substantial reductions in disruptive behaviors.

Activity choice is an easily implemented intervention that has been shown to increase compliance and reduce problem behavior without the loss of instructional time (Kern et al., 1998). It also includes choice-making opportunities for the consumer, which is often a habilitative goal with high social validity (Kern et al., 1998). There are a number of variables the practitioner must consider before selecting an activity choice intervention. First, activity choice may require up-front preparation of multiple sets of task materials from which the consumer can choose. Second, it is critical to ensure that the curricular activities are appropriate to the consumer's existing skill repertoire before presenting choices. Third, activity choice is only effective with consumers with existing choice-making skills who can tolerate instruction. Finally, because giving a consumer a choice of activities is an antecedent intervention, there is no explicit plan for how to respond to problem behavior, should it occur. Therefore, combining activity choice with a consequence-based procedure such as differential reinforcement or extinction might further reduce problem behavior. We refer the reader to the Kern et al. (1998) literature review for additional information on implementing activity-choice interventions.

Curricular and Instructional Revision

Curricular and instructional revision involves assessing aspects of the curricular targets or instructional procedures that might be aversive for the learner and making alterations to attenuate or eliminate these features to abolish escape from instruction as an effective reinforcer. To maintain consistency with the research literature, curricular and instructional revision will henceforth be referred to as curricular revision. Some of the curricular variables that might establish escape from work as a negative reinforcer are tasks that are too difficult or too easy in relation to the learner's current repertoire (Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991; Ferro, Foster-Johnson, & Dunlap, 1996; Kern, Childs, Dunlap, Clarke, & Falk, 1994; Roberts, Marshall, Nelson, & Albers, 2001), are non-preferred (Clarke et al., 1995), are novel (Mace, Browder, & Lin, 1987; Smith, Iwata, Goh, & Shore, 1995), or do not produce skills that are functional in the learner's environment (Dunlap, Foster-Johnson, Clarke, Kern, & Childs, 1995).

Dunlap et al. (1991) describe the use of curricular revision to reduce the problem behavior of a girl with mental retardation. The authors assessed the effects of four curricular variables on problem behavior: 1) fine- vs. gross-motor tasks, 2) short- vs. long-duration tasks, 3) arbitrary vs. functional tasks, and 4) activity choice vs. no choice. The assessment revealed that the participant exhibited higher rates of problem behavior and lower rates of on-task behavior when presented with fine-motor tasks, long-duration tasks, arbitrary tasks, and no activity choice. Curricular (e.g., increased functional tasks) and instructional revisions (e.g., short teaching durations) were then implemented and produced increases in on-task behavior and elimination of problem behavior.

Some of the instructional variables that might establish escape from work as a negative reinforcer include lengthy sessions (Dunlap et al., 1991; Kern et al., 1994; Smith et al., 1995), massed trials (McCurdy, Skinner, Grantham, Watson, & Hindman, 2001), certain prompting strategies (Munk &

Repp, 1994), high rates of trial presentation (Smith et al.), and low rates of positive reinforcement (Smith & Iwata, 1997). Several studies have addressed the final concern (low reinforcement during instruction). For example, Lalli et al. (1999) showed that delivering positive reinforcers for compliance was more effective in reducing escape-maintained problem behavior than delivering breaks contingent on compliance, even when the problem behavior still produced escape from the task. Similarly, Ingvarsson, Hanley, and Welter (2009) showed that the delivery of contingent and noncontingent positive reinforcers were each effective in reducing escape-maintained problem behavior. The fact that increased positive reinforcement during tasks minimizes escape-maintained problem behavior, even when contingent escape is still available (as in Lalli et al. and Ingvarsson et al.), suggests that this procedure might work to abolish the aversive properties of the tasks.

Curricular revision could result in improvements in teaching procedures or curriculum assessment that not only benefit the target consumer, but could have beneficial effects on other consumers served in the environment. Additionally, improvements in teaching strategies and curricula create a more effective learning environment which can produce more efficient and effective skill acquisition while reducing and potentially preventing problem behavior. Furthermore, it is a behavior analyst's ethical responsibility to promote effective learning environments rather than teach individuals with disabilities to tolerate ineffective ones (Winett & Winkler, 1972). However, curricular revision requires someone with expertise to assess and change aspects of the curriculum or instructional strategy. Additionally, the time and effort required to assess and make changes can be of concern if it is important to eliminate problem behavior immediately. We refer the reader to a literature review by Dunlap and Kern (1996) for additional information on curricular revision.

Demand Fading

Demand fading (instructional or stimulus fading) involves the removal of all instructions, followed by their gradual reintroduction (Pace, Iwata, Cowdery, Andree, & McIntyre, 1993). Such demand removal eliminates the aversive tasks, which remain absent until they are systematically and gradually faded back in. For example, Pace et al. faded the frequency of tasks to decrease escape-maintained SIB of three individuals with developmental disabilities. The initial elimination of all tasks substantially reduced levels of SIB and they remained low as tasks were gradually reintroduced. It is important to note that demand fading works best when implemented with escape extinction (i.e., withholding the negative reinforcer when problem behavior reemerges during fading; Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994).

Because the first step of demand fading is the elimination of all instructions, there should be an immediate decrease in problem behavior, which is a beneficial outcome for consumers who exhibit severe problem behavior or who are too large to physically prompt to comply with a task. In addition, because instructions are gradually reintroduced over time, demand fading might increase a consumer's tolerance of instructional activities. However, demand fading involves a loss of instructional time, which could be impractical due to the disruption of classroom activities or inadequate staffing to supervise the consumer while away from instruction. Also, fading in the instructions is often logistically difficult and requires the supervision of someone with expertise to oversee the process. We refer the reader to the empirical article by Zarcone et al. (1994) for additional information on demand fading.

It is a behavior analyst's ethical responsibility to promote effective learning environments rather than teach individuals with disabilities to tolerate ineffective ones

Differential Reinforcement

Differential negative reinforcement of alternative behavior. Perhaps the most common procedural form of differential negative reinforcement of alternative behavior (DNRA) involves providing escape from instruction contingent on an alternative prosocial response (e.g., compliance) while placing problem behavior on extinction (Vollmer & Iwata, 1992). Differential negative reinforcement of alternative behavior can also be arranged by providing escape for an alternative response while punishing the problem behavior or by providing more valuable breaks (e.g., longer duration) for the alternative response and less valuable breaks for the problem behavior (Athens & Vollmer, in press).

Vollmer, Roane, Ringdahl, and Marcus (1999) implemented differential negative reinforcement of compliance (with problem behavior placed on extinction) to reduce the escape-maintained SIB and aggression of two children with mental retardation. For both children, DNRA reduced problem behavior and increased compliance. In addition, when DNRA was implemented with lower integrity (i.e., problem behavior occasionally produced escape), problem behavior remained low and compliance remained high as long as compliance was reinforced on a denser schedule of reinforcement than problem behavior.

Differential negative reinforcement of alternative behavior decreases problem behavior while actively targeting more adaptive skills and providing continued access to the functional reinforcer, escape. Further, there is evidence that DNRA can

still be effective at reduced procedural integrity (Vollmer et al., 1999). However, DNRA requires the delivery of breaks immediately after the alternative response criterion is met, which might be disruptive to classroom activities or be impractical if there is inadequate staffing to supervise the consumer during the break. In addition, DNRA requires the supervision of someone with expertise to supervise schedule thinning for the alternative behavior. We refer the reader to the literature review by Vollmer and Iwata (1992) for additional information on DNRA.

In order to effectively reduce problem behavior, the communicative response, or mand for escape, should ideally require less response effort, have a denser schedule of reinforcement, and have a shorter delay to reinforcement than the problem behavior

Functional communication training. Functional communication training (FCT) is a form of DNRA that involves providing escape from instruction contingent on a communicative response (e.g., vocal, sign) as the specific prosocial behavior while problem behavior is placed on extinction (Durand & Merges, 2001) or is punished (Hanley, Piazza, Fisher, & Maglieri, 2005). In order to effectively reduce problem behavior, the communicative response, or mand for escape, should ideally require less response effort, have a denser schedule of reinforcement, and have a shorter delay to reinforcement than the problem behavior (Horner & Day, 1991). Researchers have reduced problem behavior by teaching mands for escape (Horner & Day) and for assistance (Carr & Durand, 1985). For example, Carr and Durand used FCT to reduce escape-maintained disruptive behavior (e.g., aggression, tantrums, screaming, SIB) of three children with developmental disabilities. The authors taught the participants the vocal response, "I don't understand," which was immediately followed by assistance on the task. Occurrences of disruptive behavior were followed by continued task presentation without assistance. For all three participants, FCT reduced disruptive behavior to near-zero levels.

Functional communication training decreases problem behavior while actively targeting a communication skill and providing continued access to escape. Moreover, research has demonstrated that some individuals prefer FCT over noncontingent reinforcement and extinction (Hanley, Piazza, Fisher, Contrucci, & Maglieri, 1997). However, FCT may result in high rates of the communicative response, which must immediately be followed by breaks from instruction. As with DNRA, delivering breaks contingent on the consumer's communicative responses can be logistically difficult to manage in some environments. Also as with DNRA, FCT sometimes requires the supervision of someone with expertise to oversee additional interventions to reduce high rates of the communicative response. We refer the reader to a literature review by Tiger, Hanley, and Bruzek (2008) for additional information on FCT.

Differential negative reinforcement of zero rates of responding. Differential negative reinforcement of zero rates of responding (DNRO) involves delivering escape when the problem behavior has not occurred for a specific period of time (Vollmer & Iwata, 1992). The general suggestion is to use initial intervals that are shorter than the mean inter-response time of the problem behavior during baseline, giving the individual a high probability of contacting the programmed contingency (Deitz & Repp, 1983). A common feature of DNRO is interval resetting, by which occurrences of the problem behavior immediately reset the timer to zero seconds and a new interval begins (Vollmer & Iwata). Buckley and Newchok (2006) used DNRO to reduce problem behavior maintained by escape from music of a 7-year-old boy with pervasive developmental disorder. The DNRO procedure decreased disruptive behavior to near-zero levels that were maintained as the interval duration was successfully increased to 5 min.

For problem behavior maintained by escape from instructional activities, DNRA (including FCT) is generally more preferred than DNRO because the former procedure includes a skill acquisition component (Vollmer & Iwata, 1992). Furthermore, DNRA has shown to be more effective than DNRO in reducing escape-maintained problem behavior (Roberts, Mace, & Daggett, 1995). Alternatively, DNRO may be more appropriate for increasing tolerance to an aversive activity (e.g., an invasive medical procedure) because breaks may not be permitted to be under the client's control, as they are in DNRA (Vollmer & Iwata).

One benefit of DNRO is that it provides continued access to breaks while increasing tolerance to aversive situations that are necessary, such as medical procedures. However, DNRO is labor intensive because it requires constant monitoring of the consumer for occurrences of problem behavior. In addition, providing breaks on dense schedules at treatment outset can be logistically difficult if they disrupt ongoing activities. Finally, DNRO requires the supervision of someone with expertise in establishing the DNRO intervals and monitoring the schedule thinning process. We refer the reader to the literature review by Vollmer and Iwata (1992) for additional information on DNRO.

Escape Extinction

Escape extinction involves the continued presentation of an aversive activity (e.g., instructional tasks) while eliminating the possibility of escape from the activity contingent on problem

behavior (Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990). Iwata et al. implemented escape extinction with physical guidance to reduce the escape-maintained SIB of six children with mental retardation[1]. For 5 of 6 participants, escape extinction with physical guidance reduced SIB to low levels and resulted in increased task compliance. For the sixth participant, escape extinction did not reduce SIB until response blocking was added. Further, Iwata, Pace, Cowdery, and Miltenberger (1994) showed that escape extinction was an effective treatment for escape-maintained SIB, but had no effect on SIB maintained by attention or automatic reinforcement. This finding underscores the importance of matching reductive treatments to the function of problem behavior.

The main benefit of escape extinction is that it can be combined with other treatments (e.g., activity choice, demand fading, DNRO) to enhance their effectiveness. However, escape extinction may not immediately decrease problem behavior and there is often a high degree of effort associated with implementing the procedure. Instructors are likely to implement escape extinction with lower treatment integrity than other procedures, which might make problem behavior more resistant to extinction in the future (McConnachie & Carr, 1997). Furthermore, extinction might result in a burst of responding that is at least as high as pretreatment rates and might evoke aggressive behavior, although these outcomes are not guaranteed (Lerman, Iwata, & Wallace, 1999). We refer the reader to literature reviews by Ducharme and Van Houten (1994) and Lerman and Iwata (1996) for additional information on escape extinction.

Noncontingent Escape

Noncontingent escape (NCE) involves the delivery of escape from instructional activities on a time-based schedule (e.g., fixed-time, variable-time), regardless of the individual's problem behavior (Kodak, Miltenberger, & Romanuik, 2003; Vollmer, Marcus, & Ringdahl, 1995). At the beginning of the procedure, escape is typically provided on a denser schedule than what the problem behavior typically produces (Carr & LeBlanc, 2006). After NCE is successful in reducing problem behavior, the reinforcement schedule is generally thinned to a more manageable value. For example, Vollmer et al. used NCE to reduce the escape-maintained SIB of two males with developmental disabilities and were able to thin the schedule of noncontingent (fixed time) breaks from 10 s to 2.5 min for one participant and to 10 min for the other. In addition, NCE and DNRO were compared with one of the participants and NCE resulted in quicker reductions in problem behavior.

One of the main benefits of NCE is that it immediately reduces problem behavior while continuing to provide the functional reinforcer (Vollmer et al., 1995). Additionally, because NCE is an antecedent intervention, it does not require the occurrence of problem behavior to be effective, and might even prevent problem behavior from occurring. Another potential benefit is that noncontingent reinforcement has been shown to be effective without extinction, which would make the intervention an option for when extinction is impractical (Lalli, Casey, & Kates, 1997). A potential concern with NCE is that the schedule of noncontingent breaks is quite dense at the beginning of intervention, which could be impractical or disruptive to the consumer's environment. Like other interventions that require schedule thinning, NCE requires the involvement of someone who can adequately calculate schedule values and oversee the thinning process. Another potential, but probably unlikely, concern is that noncontingent reinforcement has sometimes been shown to accidentally reinforce problem behavior (Vollmer, Ringdahl, Roane, & Marcus, 1997). In such an event, skipping or briefly delaying scheduled breaks that occur just after problem behavior should eliminate the problem. We refer the reader to the book chapters by Carr and LeBlanc (2006) and Vollmer and Wright (2003) for additional information on noncontingent escape.

Clinical Considerations and Decision Making

The clinical decision-making model described here is intended for use by individuals with experience with functional assessment and function-based treatment of problem behavior, instructional curricula, and effective teaching procedures. Seasoned practitioners who have strong influence over their clinical environments most likely have their own guides for selecting treatments. However, behavior analysts who have less control over clinical environments, such as those who consult or are newly in charge of the settings may find these recommendations useful.

Each of the treatments described in the previous section is empirically supported for the treatment of escape-maintained problem behavior. However, not every treatment is equally well-suited to a particular client or therapeutic environment. Identifying the function of problem behavior is a necessary precondition before selecting each of these interventions. Fortunately, there are numerous helpful resources for conducting a functional assessment (e.g., Carr, LeBlanc, & Love, 2008; Iwata & Dozier, 2008; Vollmer, Marcus, Ringdahl, & Roane, 1995). The next step in the process is equally important and involves consideration of specific characteristics of the client and therapeutic environment. Some important client characteristics to consider include the current skill repertoire, level of compliance, and severity and dangerousness of the problem behavior. Some important environmental factors to consider include the appropriateness of the curriculum and instruction, tolerance for disruption to others in the environment, staffing ratios, and the amount of available technical expertise.

[1] Although Iwata et al. (1990) suggested that the physical guidance necessary to keep an individual from escaping an instructional situation may constitute a form of punishment, the response reductions that typically occur under such procedures share characteristics of those associated with extinction (e.g., response bursts, gradual reductions; Iwata, Pace, Cowdery et al., 1994).

Table. Strengths and potential limitations of treatments for escape-maintained problem behavior.

Treatment	Description	Strengths	Potential Limitations
Activity Choice	Offer a choice among selected tasks	• Might prevent problem behavior • No lost instruction time • Provides choice-making opportunities • Increased compliance	• No programmed consequence for problem behavior • Requires preparation of additional instructional materials • Requires choice-making skills • Requires an appropriate curriculum be in place • Requires learners who can tolerate some instruction
Curricular and Instructional Revision	Change curricular targets or instructional procedures	• Results in improvements in teaching • Might benefit other learners in the environment • Might produce more efficient and effective skill acquisition • Might prevent problem behavior	• Requires time, effort, and expertise to change curriculum/instruction • No programmed consequence for problem behavior
Demand Fading	Remove all demands, then gradually reintroduce them over time; include escape extinction	• Immediately reduces problem behavior • The first step of the intervention (demand removal) is often already done • Might prevent problem behavior • Might increase tolerance of instruction • A good match for dangerous behavior and large clients	• Gradually fading in demands might be logistically difficult • Requires expertise to establish and oversee the fading process • Periods of non-instruction could be disruptive to classroom activities
Differential Negative Reinforcement of Alternative Behavior	Provide a break from work after a new, alternative behavior and place the problem behavior on extinction (see text for other variations)	• Actively targets new skills or increases existing ones • Provides continued access to escape throughout the intervention • May be used without extinction	• Periods of non-instruction could be disruptive to classroom activities • Requires expertise to establish and oversee schedule thinning process
Differential Negative Reinforcement of Zero Rates of Behavior	Provide a break from work if the problem behavior has not occurred for a specified amount of time and place the problem behavior on extinction	• Provides continued access to escape throughout the intervention • Useful for increasing tolerance of necessary, but aversive, stimuli	• Requires constant monitoring for occurrences of problem behavior • Periods of non-instruction could be disruptive to classroom activities • Requires expertise to establish and oversee schedule thinning process
Extinction	Do not provide a break from work contingent on problem behavior; continue presenting the task regardless of problem behavior	• Provides a contingency for problem behavior • Compatible with other treatments to enhance their effectiveness	• High response effort of implementation • Might produce a response burst or aggression • Might make behavior more resistant to extinction without strong treatment integrity • Does not result in immediate response suppression
Functional Communication Training	Provide a break from work for a new, communicative response and place the problem behavior on extinction (or punishment)	• Actively targets new skills or increases existing ones • Provides continued access to escape throughout the intervention • Preferred by some individuals over NCE and extinction • May be used without extinction	• May result in high rates of the communicative response • Does not result in immediate response suppression • Periods of non-instruction could be disruptive to classroom activities • Requires expertise to establish and oversee schedule thinning process
Noncontingent Escape	Provide breaks from work on a time-based schedule, irrespective of problem behavior	• Provides continued access to escape throughout the intervention • Immediately reduces problem behavior • Might prevent problem behavior • May be used without extinction	• May produce adventitious reinforcement of problem behavior • Periods of non-instruction could be disruptive to classroom activities • Requires expertise to establish and oversee schedule thinning process

The Table summarizes the important strengths and potential limitations of each treatment. Consider the example of NCE. For clients with very dangerous behavior, NCE is a promising option because it frequently produces immediate reductions in problem behavior, particularly when the schedule is nearly continuous. In addition, NCE can be implemented with or without extinction, making this treatment a good match for environments that are unable or unwilling to implement escape extinction. However, minimal instruction occurs during NCE, particularly at the onset of the treatment, and expertise is required to effectively guide the schedule thinning process. In addition, no new skill is explicitly targeted, which may be a concern for clients who need to develop functional communication repertoires but may not be a concern for clients who already have those repertoires.

A Clinical Model for Optimal Treatment Selection

It may be challenging for practitioners to simultaneously consider all of the relevant client and environment variables that should impact treatment selection. One solution to this challenge is to prioritize the clinical considerations and follow a specific model in decision-making. The Figure illustrates a clinical model for sequentially asking and answering questions that will lead to differential treatment selection. The ordering of the questions is based on ethical responsibilities, safety and practical considerations, and organizational issues. Each time a question is answered negatively, 1 or 2 treatments become the optimal options. The earlier in the framework a question is answered affirmatively, the more possible treatments there are from which to choose. Refer to the Table for a comparison of the strengths and potential limitations of each treatment when deciding between multiple options. Extinction in isolation is presented as an optimal alternative in one area of the model; however, several of the procedures (noted with an asterisk in the Figure) can be implemented with or without extinction depending on the constraints of the clinical situation. If clinical progress turns a "no" response into a "yes" response, but some degree of problem behavior remains, return to the clinical model. For example, if implementation of NCE or demand fading after negatively answering question 3 produces some level of compliance, you may have the option of continuing with questions 4 and 5 in the model.

The first question about the appropriateness of the curriculum and instructional procedures is important for two reasons. First, it speaks to the behavior analyst's ethical responsibility to promote effective learning environments rather than teaching individuals with disabilities to tolerate ineffective ones (Winett & Winkler, 1972). Second, improving curricular and instructional procedures is a practical way to directly address the escape contingency by abolishing the reinforcing value of escape. When clients are presented with tasks that are far above their current capabilities or are exposed to ineffective prompting strategies, learning environments are typically aversive. The most direct way to address the problem would be to teach the relevant pre-requisite skills before advanced skills and to use more effective instructional strategies, thus abolishing escape as a negative reinforcer. Such changes should enhance learning in addition to decreasing problem behavior. The practitioner will only need to progress to the next step in the model if the curriculum and instruction are appropriate, if curriculum/instructional revision fails to produce adequate treatment effects, or if influence over these variables is not currently possible.

The second question about behavioral severity and environmental tolerance for the behavior speaks to the need to determine if there must be an immediate suppression of problem behavior during treatment. Several scenarios may make it imperative that no or few problem behaviors occur at the onset of treatment. Those in the therapeutic environment may be unwilling or unable to allow a single instance of problem behavior or may insist on termination of services if even one more instance of problem behavior occurs. This situation is most likely to occur when the client is considered difficult to physically manage (e.g., a large, aggressive client), the behavior would produce unacceptable danger to the client (e.g., severe SIB, elopement), or if the behavior is socially offensive (e.g., public disrobing, sexual misbehavior). In these circumstances, providers often have already eliminated all demands in an effort to avoid problem behavior.

The aforementioned circumstances drastically limit the number of optimal treatments because certain treatments that might eventually prove effective often do not produce immediate suppression of problem behavior (e.g., extinction, FCT) and might represent a sudden reintroduction of demands into the environment (e.g., FCT, activity choice). On the other hand, demand fading and NCE immediately abolish the reinforcing value of escape and, thus, are typically associated with rapid reductions in problem behavior. In addition, these two treatments can be implemented without extinction, and stakeholders with a low tolerance for problem behavior are likely to also have little tolerance for implementation of escape extinction procedures. Consider demand fading and NCE as the optimal starting point under these circumstances. As treatment gains are made, it may become possible to consider other treatment options as an alternative or supplement and the next questions in the model can guide your selection at that time.

Third, the practitioner should consider the client's current rate of compliance with instructions. If virtually no instructions are met with compliance, demand fading and NCE are still attractive options because their early phases include few instructions with the client gradually encountering more as treatment progresses. Both of these procedures could be implemented with or without extinction depending on the environment's tolerance of escape extinction. Because the curriculum and instructional practices have already been deemed appropriate or have been revised to be appropriate, the client will presumably come into contact with sufficient reinforcement and effective prompting strategies for any newly occurring instances of compliance. Without the prior curriculum and instructional revision (i.e., question 1 in the model), it is unreasonable to expect sustained improvements in compliance and problem

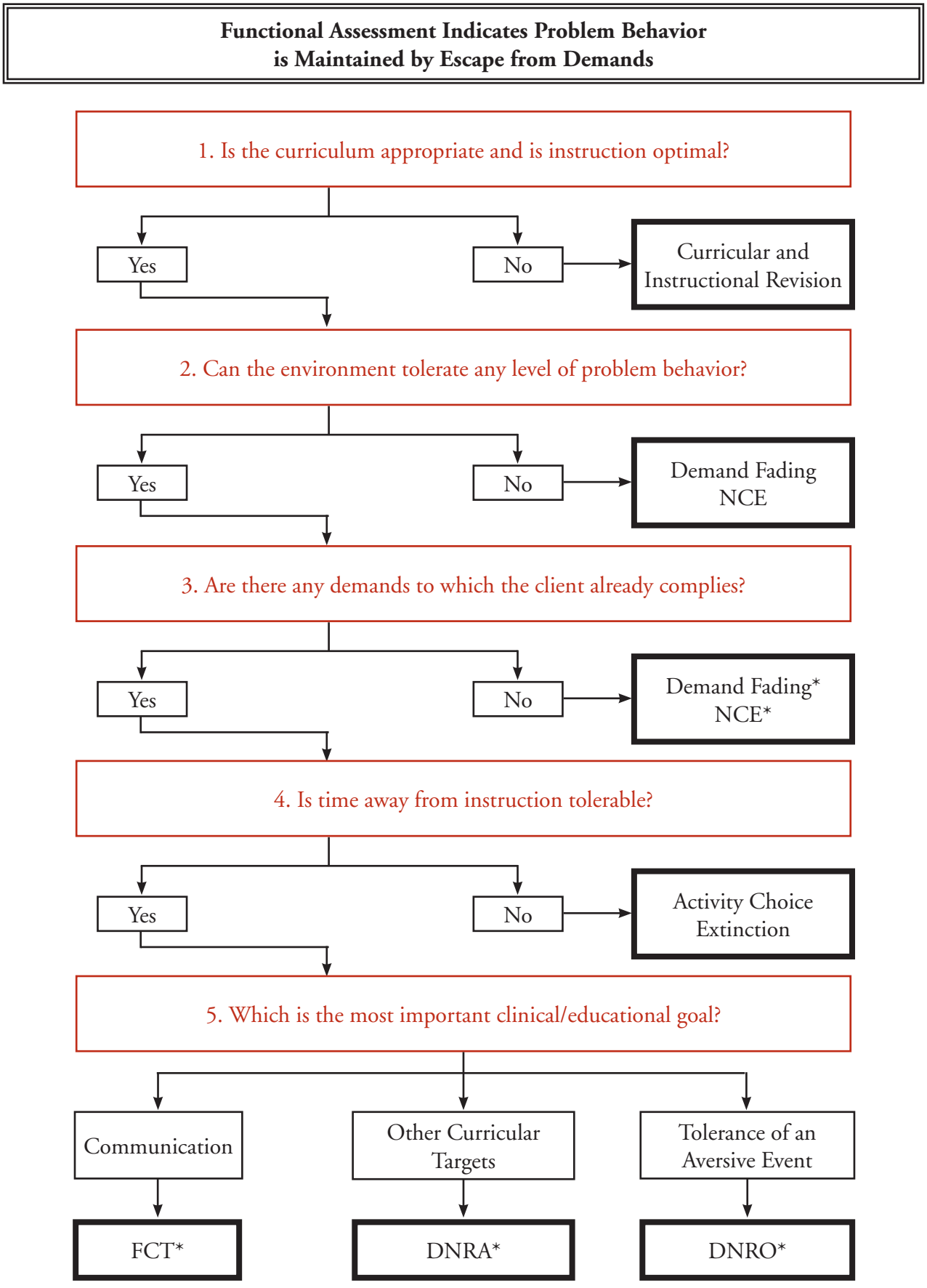

*Figure. A model for selecting function-based treatments for escape-maintained problem behavior. Note: *Consider including extinction if viable; DNRA = differential negative reinforcement of alternative behavior, DNRO = differential negative reinforcement of zero rates of behavior, FCT = functional communication training, NCE = noncontingent escape.*

behavior as instructional periods are increased. Other excellent treatments that involve a direct instructional component (e.g., FCT) or a requirement of compliance from the outset (e.g., DRA) are less optimal initially but might become viable when compliance becomes more reliable.

Next, the practitioner should consider whether time away from instruction is tolerable. Some of the common concerns with breaks from instruction include logistical difficulties associated with supervision of a learner away from the main learner group, stigma or fairness problems associated with one person getting a break while others do not, and loss of instructional opportunities when break schedules are dense. It may be possible to discuss alternatives that would mitigate implementer concerns while increasing the number of potential treatment options. For example, in an inclusive or general education environment, the first two concerns could be mitigated if the student were to remain at his/her desk while having a brief break from instruction (e.g., brief use of headphones during lecture). If you are unable to mitigate the concerns, the optimal treatments are activity choice, extinction, and DNRA with extinction. When the option of choosing seems highly preferred by the learner, activity choice is a good option and it may be combined with other treatments such as DNRA or NCE. However, it has the drawback of requiring preparation of additional materials for the learner's selection. Extinction has the advantage of directly addressing the contingency for problem behavior but the drawbacks of potential extinction-related side effects and high response effort of implementation.

The final question prompts the practitioner to choose the most pressing clinical or educational goal for the client and to select an optimal treatment accordingly. When a client does not have a meaningful communication repertoire, the optimal treatment is FCT because this treatment establishes a mand response that allows the client to synchronize breaks with his or her own motivating operations. If the client already has communication skills that would allow him to request a break, then consider targeting other important curricular areas (e.g., language, mathematics). When establishing the criterion to earn a break, remember that you can target one of many important dimensions of responding such as compliance or accuracy by providing breaks contingent on performance (i.e., DNRA). When the presenting problem involves an aversive event that has to occur for the client's well-being (e.g., medical procedures) rather than skill acquisition, DNRO presents an appealing option for producing tolerance to these events and should be initially implemented with the breaks occurring based on very brief intervals.

Conclusion

A number of effective treatments for escape-maintained behaviors have been developed and each has characteristics that make it optimal for certain environments and clients and less optimal for others. The present article summarizes the most commonly researched function-based treatments for escape-maintained behavior and the clinical contexts for which they are most appropriate. In addition, we provide a clinical model for selecting function-based treatments based on client characteristics and the constraints of the therapeutic environment.

Our model is based on selecting a single optimal intervention at a time, which is advisable when the behavior analyst needs to train providers to proficiency and ensure high treatment fidelity. However, one treatment may sometimes enhance the effects of another. For example, providing activity choice or adding an extinction contingency may enhance the effects of any of the other treatments (e.g., DNRA, FCT, NCE). However, the behavior analyst should consider whether the response effort associated with implementing additional treatment components is likely to produce fatigue or poor treatment integrity. One particular treatment combination to avoid is NCE combined with FCT because research indicates that NCE interferes with acquisition of the communication response, at least when the NCE schedule is rich (Goh, Iwata, & DeLeon, 2000). However, these two treatments might be implemented sequentially. In our model, a practitioner might initially select NCE as an optimal treatment (at questions 2 and 3) and elect to target a functional communication response after NCE has been successfully discontinued or the schedule has been thinned.

We have attempted to integrate the findings from a large experimental literature on treatments for escape-maintained problem behavior into a decision-making framework for practicing behavior analysts. Although the model is based on the empirical literature, our clinical experience guided the ordering of the questions and the determination of the appropriateness and usefulness of treatments at different decision points. We have no experimental evidence that this particular model is more effective than any alternative, but it is a logical framework for the practitioner seeking guidance in treatment selection that could be experimentally validated in future research.

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Address correspondence to James E. Carr, Department of Psychology, 226 Thach Hall, Auburn University, AL 36849-5214 (e-mail: carr@auburn.edu).

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